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HEADQUARTERS TASK GROUP 7.1  
JOINT TASK FORCE 7

J-Division

LOS ALAMOS SCIENTIFIC LABORATORY

P. O. Box 1663

Los Alamos, New Mexico

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unit  
28 Aug 54*

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FT. GROVES A.D.G. DATE:  
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Headquarters  
Special Weapons Center  
Kirtland Air Force Base  
Albuquerque, New Mexico

Attention: Deputy Commander for Overseas Tests

1. In response to your request dated 11 May 1953, for comments on the first indorsement from JTF-7 to your letter of 24 April 1953, the following information is offered relative to the need for a new radiation rate instrument for cloud sampling.

a. While it is true that the present Jasper (IM-71/PD) incorporates basic improvements over the IVY instrument with respect to chamber material and general workmanship, the improved model retains serious faults which greatly impair its usefulness for cloud sampling. Because it is primarily designed as a ground survey instrument, its chief failing is a pronounced dependence of readings upon cockpit altitude and upon the intensity itself. Decompression chamber measurements made at Indian Springs on a typical instrument indicate that at a 30,000 foot altitude (i.e., expected cockpit pressure for the present P84G at 45,000 feet) the readings are 75% low for a 1 R/hr initial rate at field altitude, 60% low for a 10 R/hr initial rate, and 25% low for a 100 R/hr initial rate. In addition to the above major fault, some of the mechanical features of the instrument are not adapted to the present airborne use of the instrument. Because of breathing undergone by the case on altitude change, furthermore, some corrosion difficulties with the internal electrical contacts can be expected under tropical conditions. In summary, the instrument as presently constructed is not satisfactory.

b. The AN/PDR-32 has been examined at Indian Springs AFB. Although it showed no appreciable effect in decompression chamber experiments up to 30,000 feet, it uses several pressure-sensitive components which would be affected by more severe pressure changes. A major objection is that the meter needs a new lens about an average point on the meter face in such a

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by authority of the U. S. Atomic Energy Commission.

*William W. Hancock 15 Aug 1954*  
(Person authorizing change in classification) (Date)

*Jesse E. Beas 15 Aug 1954*  
(Signature of person making the change, and date)

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way as to make its operational use by a pilot difficult. A pulsed movement gave a factor of two range for a nominal reading of 160 R/hr at which the effect was checked. It is understood that the present circuit could be redesigned to decrease this effect which results from the use of a vibrator to produce amplification of the output signal current. Use of a vibrator for this purpose, as well as to obtain the high voltage for the geiger tubes, introduces the possibility of sudden and complete failure during airborne operations. The response of the instrument to 70-kev gamma radiation is estimated to be high by a factor of two. Since only two percent of the total current output is available for meter response above 100 R/hr, large errors in indicated rate can occur in the 100 to 500 R/hr range. In view of the foregoing considerations, use of this instrument is not recommended.

c. Because the novel pulsed-geiger tube principle is still in a preliminary development and testing stage, the MT-1 is not considered likely to prove satisfactory. It is not recommended that this instrument be considered.

2. While the present Jasper has some serious faults, it also has a number of desirable features. Its response time is short, it has a stable logarithmic circuit, its energy response can be adjusted to give negligible error at a gamma ray energy of 70 kev, its physical size is small, and it has a simple battery power supply with adequate life. Discussion with Mr. Joseph Johnston of the Signal Corps Electronic Laboratory, who developed the instrument, indicates that the faults mentioned in paragraph 1a can be eliminated by modifications of the Jaspers which are now being used. It is understood that the Signal Corps could accomplish these improvements at nominal additional cost and that the result would be an instrument which could probably be used satisfactorily. Internal corrosion resulting from case breathing in tropical use can be minimized by careful handling, together with storage and maintenance in a properly de-humidified room. It is recommended that as soon as possible a request be transmitted to the Signal Corps to accomplish the above modifications on a 1A Priority basis. Details of the modifications as discussed with Mr. Johnston will be furnished if desired.

3. Because the Jasper, even with the above modifications, still basically represents an instrument designed primarily for ground survey use, it can be expected to give marginal performance in the long run in the cloud sampling application. Its use would be based upon the assumption that the modifications proposed produce satisfactory results without prior field tests or operational evaluation. It is, therefore, recommended that support be given to the development of an instrument specifically designed for airborne use. It is suggested that both possibilities listed below be explored.

a. It is understood that Tracerlab has submitted a proposal for the development and fabrication of a suitable airborne instrument to JTF-7. Their proposal is based upon informal discussions of the requirements and alternatives with Tracerlab representative at Indian Springs AFB. Because

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of the satisfactory performance of the wing tank ion chamber designed and fabricated for IVY by Tracerlab, it is felt that a replacement for Jasper designed and furnished by this company could be expected to perform satisfactorily.

b. With what is a basically sound circuit and with the background of experience in the airborne use of the present Jasper, the Signal Corps Electronic Laboratory should be able to design and supply at minimum cost a rate instrument which is primarily designed for airborne, tropical use. Discussion with Mr. Johnston indicates that such an instrument could utilize the Jasper circuit, have suitable mechanical features for airborne operation, and have a size approximately that of a standard altimeter case. He stated, however, that development and complete fabrication could not be accomplished in time but that several prototypes could be supplied for evaluation. It is recommended that a separate Priority LA request for this development be submitted to the Signal Corps Laboratory as soon as possible. Detailed specifications for this instrument are being formulated and can be supplied if desired.

HFP:k

*H.F.P.*  
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Harold F. Plank  
J-11

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